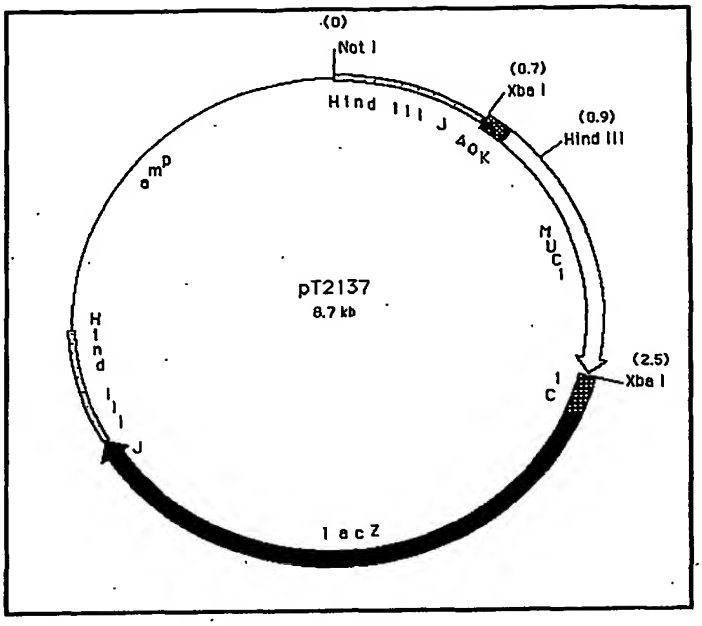

Figure 1

Restriction Endonuclease Map of Plasmid pT2137

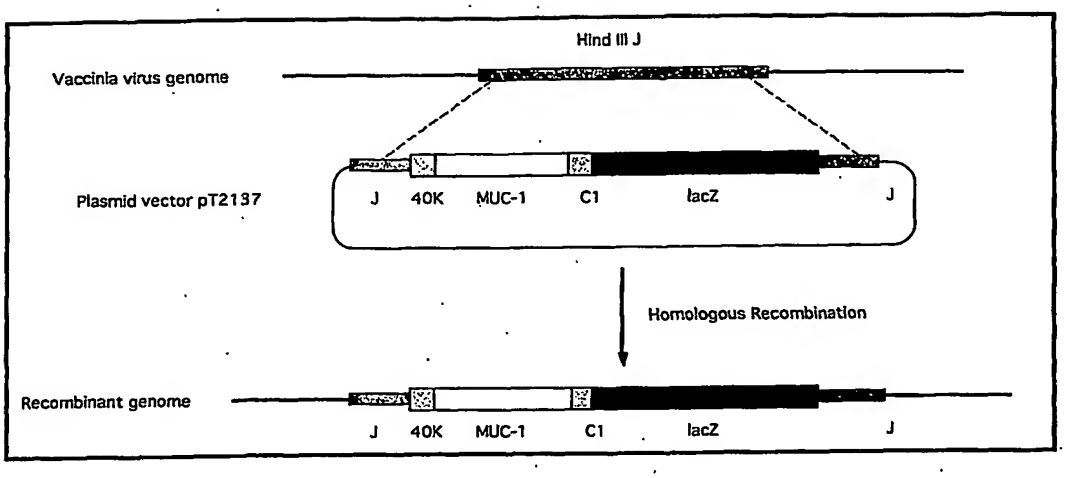

Figure 2

rV-MUC-1 Vector Schematic

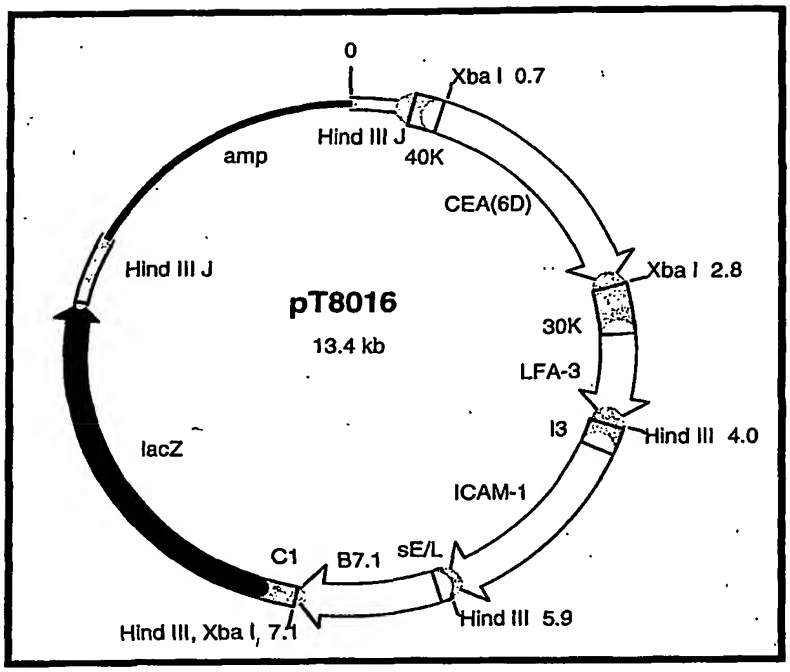

Figure 3

Restriction Endonuclease Map of Plasmid pT8016

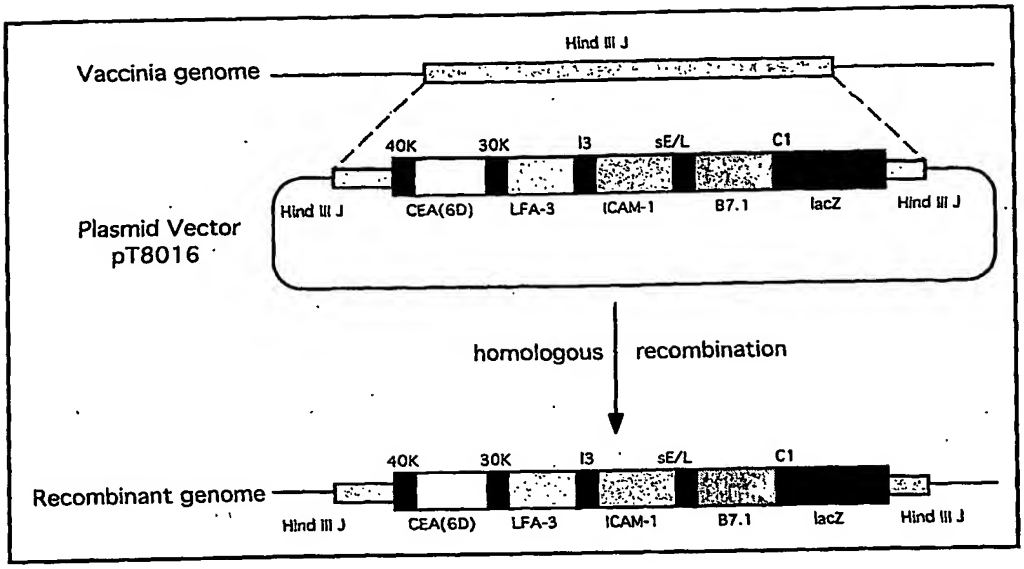

Figure 4

Generation of rV-CEA(6D)/TRICOM Recombinant Vaccinia Virus

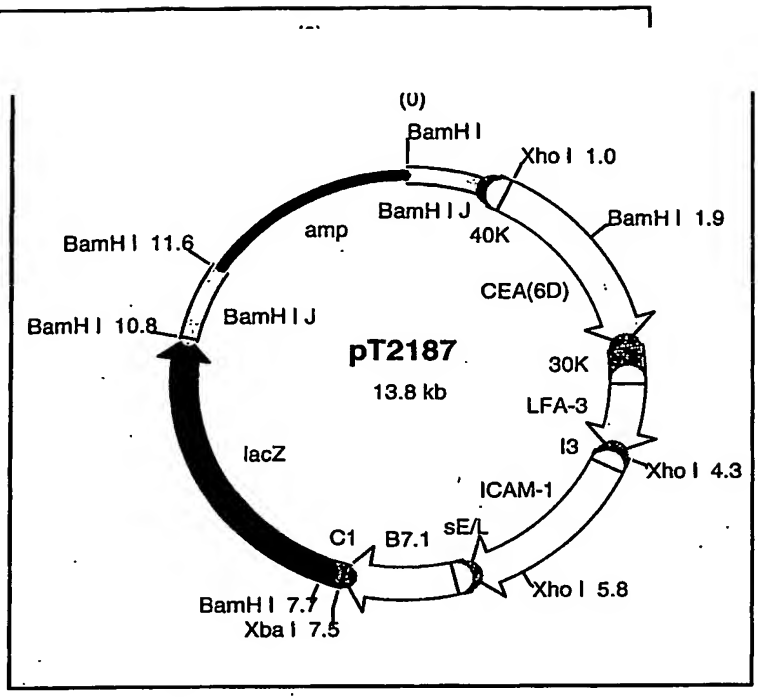

Figure 5

Restriction Endonuclease Map of Plasmid pT2187

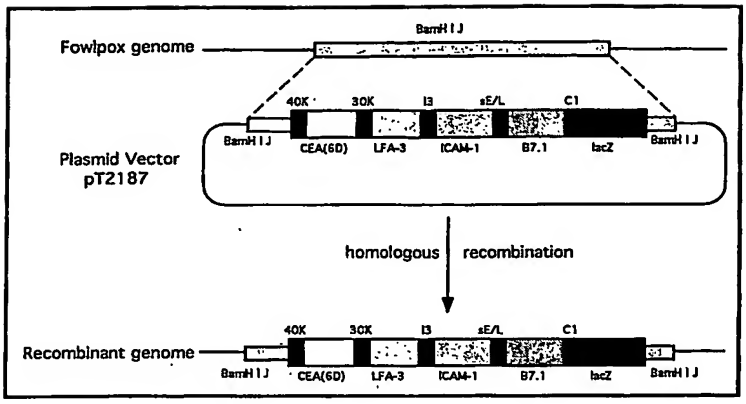

Figure 6

Generation of rF-CEA(6D)/TRICOM Recombinant Fowlpox Virus

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   1 ATGACACCGG GCACCCAGTC TCCTTTCTTC CTGCTGCTGC TCCTCACAGT GCTTACAGTT
  61 GTTACGGGTT CTGGTCATGC AAGCTCTACC CCAGGTGGAG AAAAGGAGAC TTCGGCTACC
 121 CAGAGAAGTT CAGTGCCCAG CTCTACTGAG AAGAATGCTG TGAGTATGAC AAGCTCCGTA
 181 CTCTCCAGCC ACAGCCCCGG TTCAGGCTCC TCCACCACTC AGGGACAGGA TGTCACTCTG
 241 GCCCCGGCCA CGGAACCAGC TTCAGGTTCA GCTGCCTTGT GGGGACAGGA TGTCACCTCG
 301 GTACCAGTTA CTAGACCAGC TTTAGGTAGC ACAGCACCTC CTGCTCATGG AGTAACTAGT
 361 GCTCCTGATA CTCGTCCAGC TCCTGGCAGT ACTGCACCAC CGGCACATGG CGTAACATCA
 421 GCACCTGATA CAAGACCTGC ACCTGGATCT ACAGCGCCGC CTGCGCACGG AGTGACATCG
 481 GCGCCCGATA CGCGCCCCGC TCCCGGTAGC ACCGCACCGC CCGCCCACGG TGTTACAAGT
 541 GCACCCGATA CCCGGCCGGC ACCCGGAAGT ACCGCTCCAC CTGCACACGG GGTCACAAGC
 601 GCGCCAGACA CTCGACCTGC GCCAGGGTCG ACTGCCCCTC CGGCGCATGG TGTGACCTCA
 661 GCTCCTGACA CAAGGCCAGC CCCAGCTAGC ACTCTGGTGC ACAACGGCAC CTCTGCCAGG
 721 GCTACCACAA CCCCAGCCAG CAAGAGCACT CCATTCTCAA TTCCCAGCCA CCACTCTGAT
 781 ACTCCTACCA CCCTTGCCAG CCATAGCACC AAGACTGATG CCAGTAGCAC TCACCATAGC
 841 ACGGTACCTC CTCTCACCTC CTCCAATCAC AGCACTTCTC CCCAGTTGTC TACTGGGGTC
 901 TCTTTCTTTT TCCTGTCTTT TCACATTTCA AACCTCCAGT TTAATTCCTC TCTGGAAGAT
 961 CCCAGCACCG ACTACTACCA AGAGCTGCAG AGAGACATTT CTGAAATGTT TTTGCAGATT
1021 TATAAACAAG GGGGTTTTCT GGGCCTCTCC AATATTAAGT TCAGGCCAGG ATCTGTGGTG
1081 GTACAATTGA CTCTGGCCTT CCGAGAAGGT ACCATCAATG TCCACGACGT GGAGACACAG
1141 TTCAATCAGT ATAAAACGGA AGCAGCCTCT CGATATAACC TGACGATCTC AGACGTCAGC
1201 GTGAGTGATG TGCCATTTCC TTTCTCTGCC CAGTCTGGGG CTGGGGTGCC AGGCTGGGGC
1261 ATCGCGCTGC TGGTGCTGGT CTGTGTTCTG GTTGCGCTGG CCATTGTCTA TCTCATTGCC
1321 TTGGCTGTCT GTCAGTGCCG CCGAAAGAAC TACGGGCAGC TGGACATCTT TCCAGCCCGG
1381 GATACCTACC ATCCTATGAG CGAGTACCCC ACCTACCACA CCCATGGGCG CTATGTGCCC
1441 CCTAGCAGTA CCGATCGTAG CCCCTATGAG AAGGTTTCTG CAGGTAATGG TGGCAGCAGC
1501 CTCTCTTACA CAAACCCAGC AGTGGCAGCC ACTTCTGCCA ACTTGTAG
```

FIGURE 7

SEQUENCE OF wMUC-1(6), SEQ. ID. NO: 1

MTPGTQSPFFLLLLLTVLTVVTGSGHASSTPGGEKETSATQRSSVPSSTEKNAV
SMTSSVLSSHSPGSGSSTTQGQDVTLAPATEPASGSAALWGQDVTSVPVTRPAL
GSTAPPAHGVTSAPDTRPAPGSTAPPAHGVTSAPDTRPAPGSTAPPAHGVTSAP
DTRPAPGSTAPPAHGVTSAPDTRPAPGSTAPPAHGVTSAPDTRPAPGSTAPPAH
GVTSAPDTRPAPASTLVHNGTSARATTTPASKSTPFSIPSHHSDTPTTLASHST
KTDASSTHHSTVPPLTSSNHSTSPQLSTGVSFFFLSFHISNLQFNSSLEDPSTD
YYQELQRDISEMFLQIYKQGGFLGLSNIKFRPGSVVVQLTLAFREGTINVHDVE
TQFNQYKTEAASRYNLTISDVSVSDVPFPFSAQSGAGVPGWGIALLVLVCVLVA
LAIVYLIALAVCQCRRKNYGQLDIFPARDTYHPMSEYPTYHTHGRYVPPSSTDR
SPYEKVSAGNGGSSLSYTNPAVAATSANL

FIGURE 8

AMINO ACID SEQUENCE OF wMUC-1(6), SEQ. ID. NO: 2

```
   1 ATGGAGTCTC CCTCGGCCCC TCCCCACAGA TGGTGCATCC CCTGGCAGAG GCTCCTGCTC
  61 ACAGCCTCAC TTCTAACCTT CTGGAACCCG CCCACCACTG CCAAGCTCAC TATTGAATCC
 121 ACGCCGTTCA ATGTCGCAGA GGGGAAGGAG GTGCTTCTAC TTGTCCACAA TCTGCCCCAG
 181 CATCTTTTTG GCTACAGCTG GTACAAAGGT GAAAGAGTGG ATGGCAACCG TCAAATTATA
 241 GGATATGTAA TAGGAACTCA ACAAGCTACC CCAGGGCCCG CATACAGTGG TCGAGAGATA
 301 ATATACCCCA ATGCATCCCT GCTGATCCAG AACATCATCC AGAATGACAC AGGATTCTAC
 361 ACCCTACACG TCATAAAGTC AGATCTTGTG AATGAAGAAG CAACTGGCCA GTTCCGGGTA
 421 TACCCGGAAC TCCCTAAGCC TTCTATTAGC TCCAATAATA GTAAGCCTGT CGAAGACAAA
 481 GATGCCGTCG CTTTTACATG CGAGCCCGAA ACTCAAGACG CAACATATCT CTGGTGGGTG
 541 AACAACCAGT CCCTGCCTGT GTCCCCTAGA CTCCAACTCA GCAACGGAAA TAGAACTCTG
 601 ACCCTGTTTA ACGTGACCAG GAACGACACA GCAAGCTACA AATGCGAAAC CCAAAATCCA
 661 GTCAGCGCCA GGAGGTCTGA TTCAGTGATT CTCAACGTGC TTTACGGACC CGATGCTCCT
 721 ACAATCAGCC CTCTAAACAC AAGCTATAGA TCAGGGGAAA ATCTGAATCT GAGCTGTCAT
 781 GCCGCTAGCA ATCCTCCCGC CCAATACAGC TGGTTTGTCA ATGGCACTTT CCAACAGTCC
 841 ACCCAGGAAC TGTTCATTCC CAATATTACC GTGAACAATA GTGGATCCTA CACGTGCCAA
 901 GCTCACAATA GCGACACCGG ACTCAACCGC ACAACCGTGA CGACGATTAC CGTGTATGAG
 961 CCACCAAAAC CATTCATAAC TAGTAACAAT TCTAACCCAG TTGAGGATGA GGACGCAGTT
1021 GCATTAACTT GTGAGCCAGA GATTCAAAAT ACCACTTATT TATGGTGGGT CAATAACCAA
1081 AGTTTGCCGG TTAGCCCACG CTTGCAGTTG TCTAATGATA ACCGCACATT GACACTCCTG
1141 TCCGTTACTC GCAATGATGT AGGACCTTAT GAGTGTGGCA TTCAGAATGA ATTATCCGTT
1201 GATCACTCCG ACCCTGTTAT CCTTAATGTT TTGTATGGCC CAGACGACCC AACTATATCT
1261 CCATCATACA CCTACTACCG TCCCGGCGTG AACTTGAGCC TTTCTTGCCA TGCAGCATCC
1321 AACCCCCCTG CACAGTACTC CTGGCTGATT GATGGAAACA TTCAGCAGCA TACTCAAGAG
1381 TTATTTATAA GCAACATAAC TGAGAAGAAC AGCGGACTCT ATACTTGCCA GGCCAATAAC
1441 TCAGCCAGTG GTCACAGCAG GACTACAGTT AAAACAATAA CTGTTTCCGC GGAGCTGCCC
1501 AAGCCCTCCA TCTCCAGCAA CAACTCCAAA CCCGTGGAGG ACAAGGATGC TGTGGCCTTC
1561 ACCTGTGAAC CTGAGGCTCA GAACACAACC TACCTGTGGT GGGTAAATGG TCAGAGCCTC
1621 CCAGTCAGTC CCAGGCTGCA GCTGTCCAAT GGCAACAGGA CCCTCACTCT ATTCAATGTC
1681 ACAAGAAATG ACGCAAGAGC CTATGTATGT GGAATCCAGA ACTCAGTGAG TGCAAACCGC
1741 AGTGACCCAG TCACCCTGGA TGTCCTCTAT GGGCCGGACA CCCCCATCAT TTCCCCCCCA
1801 GACTCGTCTT ACCTTTCGGG AGCGGACCTC AACCTCTCCT GCCACTCGGC CTCTAACCCA
1861 TCCCCGCAGT ATTCTTGGCG TATCAATGGG ATACCGCAGC AACACACACA AGTTCTCTTT
1921 ATCGCCAAAA TCACGCCAAA TAATAACGGG ACCTATGCCT GTTTTGTCTC TAACTTGGCT
1981 ACTGGCCGCA ATAATTCCAT AGTCAAGAGC ATCACAGTCT CTGCATCTGG AACTTCTCCT
2041 GGTCTCTCAG CTGGGGCCAC TGTCGGCATC ATGATTGGAG TGCTGGTTGG GGTTGCTCTG
2101 ATATAG
```

FIGURE 9

DNA SEQUENCE OF wCEA(6D), SEQ. ID. NO: 3

nsnpvededavaltcepeiqnttylwwvnnqslpvsprlqlsndnrtltllsvtrndvgpy
ecgiqnelsvdhsdpvilnvlygpddptispsytyyrpgvnlslschaasnppaqyswlid
gniqqhtqelfisniteknsglytcqannsasghsrttvktitvsaelpkpsissnnskpv
edkdavaftcepeaqnttylwwvngqslpvsprlqlsngnrtltlfnvtrndarayv
cgiqnsvsanrsdpvtldvlygpdtpiisppdssylsganlnlschsasnpspqyswrin
gipqqhtqvlfiakitpnnngtyacfvsnlatgrnnsivksitvsasgtspglsagatvg
imigvlvgvali

FIGURE 10

AMINO ACID SEQUENCE OF HUMAN wCEA(6D), SEQ. ID. NO: 4

PANVAC-F Plasmids pT1154 and pT8150

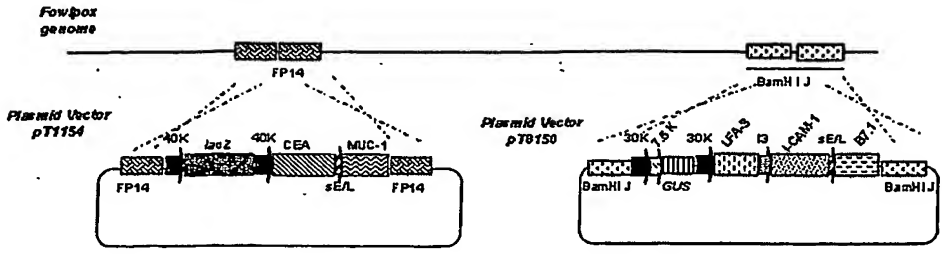

FIGURE 11

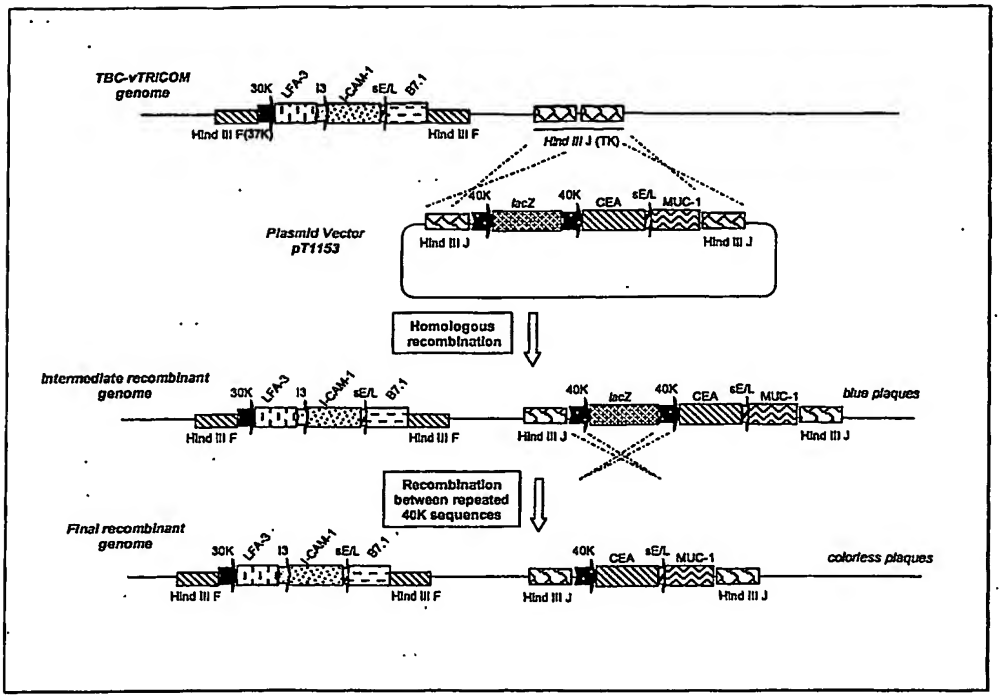

FIGURE 12

GENERATION OF PANVAC-V RECOMBINANT VACCINIA VIRUS

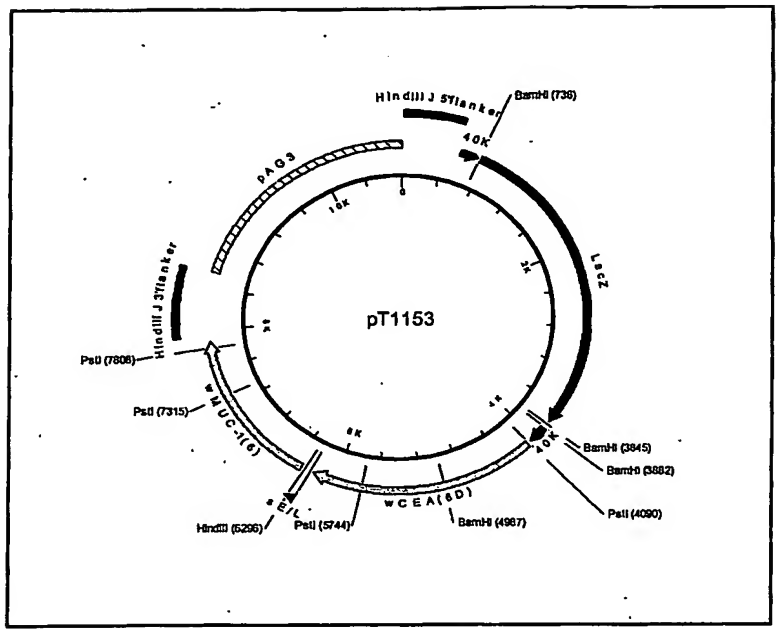

FIGURE 13

RESTRICTION ENDONUCLEASE MAP OF PLASMID PT1153

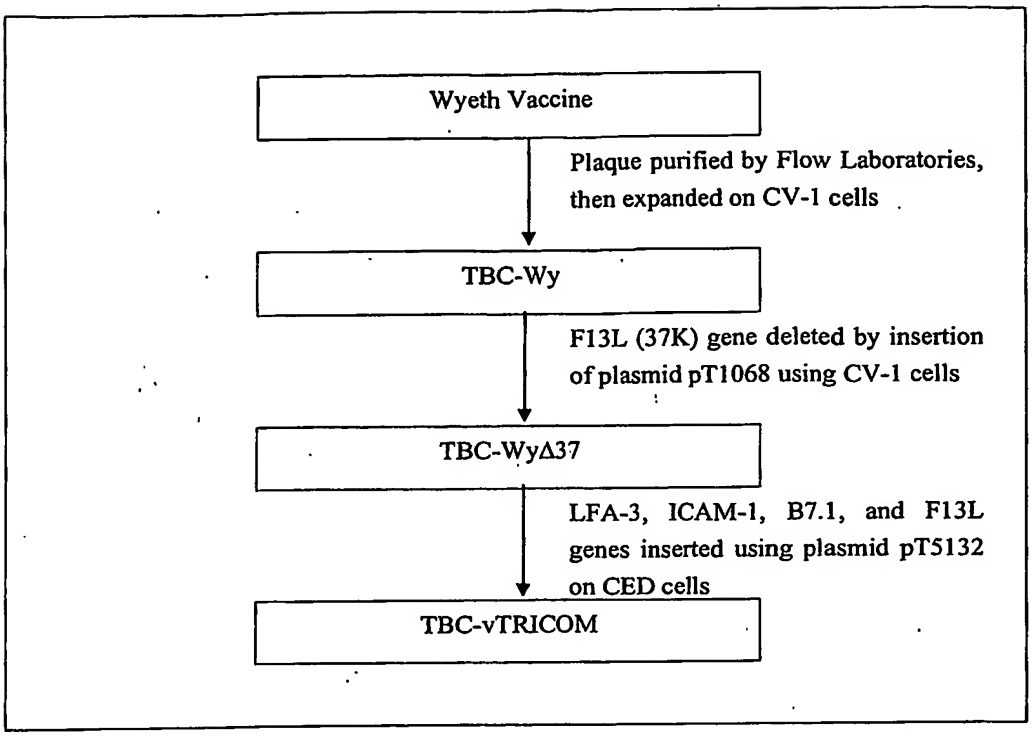

Figure 14

Derivation of Parental Virus TBC-vTRICOM

FIGURE 15: NEW BREAST CANCER CASES PROJECTED FOR 2004

Stage	%	New Cases	5-yr survival	Treatment Options
O	17%	36,965	100%	-Lumpectomy and radiation -Simple mastectomy
I	40%	86,976	98%	-Lumpectomy and radiation -Simple mastectomy -If >1cm adjuvant chemo or hormone therapy
II	31%	67,406	76-88%	-Surgery and adjuvant systematic therapy (radiation, chemo, tamoxifen)
III	6%	13,046	49-56%	-Surgery and adjuvant systematic therapy (radiation, chemo, tamoxifen) -Neoadjuvant chemotherapy before surgery
IV	3%	6,523	16% Median Survival 2.2 Yr.	-Systematic hormonal therapy and Cytotoxic chemotherapy -Immunotherapy with Herceptin -Palliative radiation or surgery
Stage Unknown	3%	6,523		

Shift to earlier diagnosis, decreasing mortality